

*Dr. Hopkins says Amst
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Northern Rhodesia

Department of Agriculture

ANNUAL REPORT
for the Year
1955

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Department of Agriculture

ANNUAL REPORT FOR THE YEAR 1955

PART I—AGRICULTURE IN THE TERRITORY

INTRODUCTION

In spite of the vagaries of the weather the year has been one of sound agricultural progress. Rainfall was above average in all parts of the country, and whilst growing conditions proved favourable in the Eastern, Northern, Western and North-Western provinces, excessive rains in December and lack of sunshine in the growing season depressed yields in our main producing areas in the Southern and Central provinces.

2. Receipts of maize by the Maize Control Board were just below 1,000,000 bags against an estimated consumption of 1,200,000 bags. Thanks to the large carry-over from the previous bumper year, no imports will be needed to make good the shortfall. Food supplies generally throughout the Territory are satisfactory.

3. Tobacco farmers on the line of rail enjoyed a successful season. The number of registered flue-cured growers declined to 186 and the acreage also declined slightly. Total production increased, however, to 5,363,000 lb. which fetched a satisfactory average price of 37.82*d.* per lb. The Eastern Area suffered a disastrous season. The number of growers dropped to ninety-two and the production totalled 2,242,000 lb. for which the average price realised was only 27.21*d.* Burley production in the Eastern Province showed an upward trend, a total of 157,000 lb. being sold on the Limbe floors for an average price of 25.21*d.* per lb. Interest in Turkish tobacco is reviving, production totalled 150,000 lb. which sold for an average price of 33*d.* per lb.

4. Groundnut production in the Eastern Province showed satisfactory expansion to around 5,000 tons: all internal demands were fully met and a small export was profitably made through the port of Beira.

5. Regional conservation planning made excellent progress in European farming areas during the year. All line of rail farming areas have now been aerially photographed and competition for priority in planning is keen between Intensive Conservation Areas.

6. The Central Agricultural Research Station at Mount Makulu, situated nine miles south of Lusaka, was formally opened by the Governor, Sir Arthur Benson, on 17th March, just twenty years after the economic depression made it necessary to close the Agricultural Research Station at Mazabuka.

7. Important surveys were carried out during the year, notably the Land Use Survey of the Copperbelt; Land Usage in the Ngoni Reserve in the Eastern Province; Pasture and Veld Management by two F.O.A. Grassland Experts, Messrs. Dutton and Enlow from the United States of America; and an investigation into African cash crop farming carried out by the Agricultural Economist.

8. The Northern Rhodesia Agricultural Society's Show was held in Lusaka on 31st July and 1st and 2nd August. Again all records for entries and attendance were broken and the show, which was opened by the Governor-General, Lord Llewellyn, provided the highlight of the farming year.

9. A motion to transfer the control of European agriculture in Northern Rhodesia to the Federal Government, in accordance with the provisions of section 31 of the Constitution, was adopted in the Legislature in July, and a Bill giving effect to this transfer with effect from the 1st January, 1956, was passed in December. This is therefore the last annual report of the Northern Rhodesian Department of Agriculture which will refer to European agriculture.

CROP REPORTS

Maize

10. Maize offered for sale to the Maize Control Board in 1955 totalled 935,000 bags by comparison with the previous year's record of 1,256,000 bags. European production declined by 7 per cent., whereas the African crop was less by 45 per cent. The great variation of yield in the African crop from year to year provides a clear indication of the need for improvement and stabilisation in African farming methods. The producer price of maize for the 1955 season was 40s. 3d. per 200-lb. bag exclusive of the cost of the bag. The cash payment for African grown maize was 27s. 3d. at rural buying depots; the difference between this and the standard price, after meeting transport and buying expenses, was credited to the African Farming Improvement Fund.

The trend of European production is shown in tabular form below—

MAIZE PRODUCTION ON EUROPEAN FARMS

<i>Season</i>	<i>Acreage planted</i>	<i>Estimated total crop reaped (200-lb. bags)</i>	<i>Estimated bags per acre reaped</i>
1947-48	65,800	435,000	6.6
1948-49	74,040	370,500	5.0
1949-50	105,000	575,000	5.4
1950-51	98,265	467,000	4.7
1951-52	98,000	433,500	4.4
1952-53	105,000	602,343	5.7
1953-54	108,228	713,122	6.59
1954-55	109,292	665,000	6.1

11. The general outlook for maize supplies in the Territory is that present prices are stimulating production and recent fertiliser recommendations are having an appreciable influence upon yields. There seems to be good reason to expect production and consumption to keep pace with one another particularly if the Maize Control Board's storage programme can be implemented to allow a full six months' supply to be carried over to even out seasonal variations.

12. The trend of production from European and African growers on the line of rail for the last ten years is shown in the table below—

MAIZE PRODUCTION FOR SALE IN THE RAILWAY BELT

(Thousands of bags of 200 lb.)

<i>Year</i>	<i>European grown</i>	<i>African grown</i>	<i>Total</i>
1946	268	172	440
1947	190	54	244
1948	343	296	639
1949	283	61	344
1950	447	344	791
1951	399	290	689
1952	389	173	562
1953	602	435	1,037
1954	661	595	1,256
1955	615	320	935

13. In the Eastern Province growing conditions during the 1954-55 season were particularly favourable and a record crop of 133,800 bags was reaped, of which it is expected that 100,000 bags will be exported to the line of rail. The trend of development is as follows:

MAIZE MARKETING IN THE EASTERN PROVINCE

<i>Year</i>	<i>Local production</i>	<i>Imports</i>	<i>Total</i>	<i>Exports</i>
1949	30,500	22,500	53,000	Nil
1950	48,000	12,000	60,000	Nil
1951	80,000	Nil	80,000	37,700
1952	101,000	Nil	101,000	77,670
1953	129,100	Nil	129,100	107,764
1954	101,186	Nil	101,186	65,000
1955	133,809	Nil	133,809	100,000

Tobacco

14. There has been little change in the general pattern of production during the year. Production in the Western Area is consolidating itself with yields and quality improving and a rationalisation of acreage. The following comparative figures show the trend of production for the last ten years:

TOBACCO PRODUCTION								
(in lb. weight)								
Season	Flue-cured E.A.	Virginia W.A.	Total	Other Virginia (a)	Burley (a)	Turkish		Total all types
						E.A.	W.A.	
1945-46 ...	2,823,000	307,000	3,130,000	43,000	77,000	28,000	1,000,000	4,278,000
1946-47 ...	2,928,600	500,000	3,428,600	83,000	125,000	26,500	1,000,000	4,663,100
1947-48 ...	2,988,000	781,500	3,769,500	*	140,000	—	858,590	4,768,090†
1948-49 ...	4,076,300	1,691,600	5,767,900	*	178,800	—	97,000	6,043,700†
1949-50 ...	3,214,500	2,956,500	6,171,000	42,500	327,100	—	115,330	6,655,930
1950-51 ...	4,413,894	6,262,457	10,676,351	50,000	252,879	—	49,368	11,028,598
1951-52 ...	4,104,669	5,418,723	9,523,392	25,000	124,180	—	50,000	9,722,572
1952-53 ...	3,584,444	6,739,094	10,323,538	*	106,557	—	30,356	10,460,451†
1953-54 ...	2,809,051	5,176,089	7,985,140	11,000	100,556	—	37,000	8,133,696
1954-55 ...	2,242,139	5,363,880	7,606,019	—	157,144	25,500	124,500	7,913,163

NOTE.—(a)=Production confined to Eastern Area.
E.A.=Eastern Area.
W.A.=Western Area.
*Not obtainable.
†Incomplete.

(a) Flue-cured Virginia Tobacco

15. Farmers in the Western tobacco area, that is on the line of rail, enjoyed a successful year in spite of difficulties with heavy rains in December. In the Eastern tobacco area continuous rain and lack of sunshine in February reduced a crop of promise to one of mediocrity which was reflected in the prices received on the Salisbury floors. Comparative figures for flue-cured production in the two areas for the past few years are as follows:

FLUE-CURED PRODUCTION					
Season	Registered growers (No.)	Acreage	Production (lb.)	Average price per lb. d.	
WESTERN AREA					
1951-52 ...	...	304	16,740	5,419,000	32.25
1952-53 ...	...	267	14,000	6,739,000	34.92
1953-54 ...	...	215	9,331	5,176,089	34.88
1954-55 ...	...	186	7,700	5,363,880	37.82
EASTERN AREA					
1951-52 ...	...	203	11,000	4,220,000	20.71
1952-53 ...	...	135	6,200	3,584,000	27.37
1953-54 ...	...	110	5,100	2,809,051	27.47
1954-55 ...	...	92	4,200	2,242,510	27.21

16. In the Western area the industry is going ahead on sound lines; yields averaged 696 lb. per acre and the acceptance by the trade is well shown in the satisfactory prices received; in the forthcoming season tobacco from this area will be sold over the Salisbury floors unidentified. As farmers become better established there are encouraging signs of diversification of enterprise; a considerable quantity of maize is now being produced on the residual fertiliser values after tobacco, and much interest is being shown in grass planting as the numbers of livestock increase. In the Central Province a number of growers have developed overhead irrigation for tobacco for from ten to twenty acres with satisfactory results.

17. In the Eastern area the industry has gone steadily downhill since the 1951 season and many growers have been forced out of production. Reduced financial reserves, rising costs of fuel, fertiliser and building materials, and a lack of interest by the trade have combined to produce a desperate economic situation which is receiving special attention from Government.

(b) Turkish Tobacco

18. Interest in Turkish tobacco has been stimulated during the year by attractive prices offered by the Kalomo Tobacco Warehouse acting on behalf of the Falls City Company of America for leaf of the variety Samsun. A total of 150,000 lb. was purchased by this company at an average price of 33d. per lb. Approximately a sixth of this production came from the Eastern area.

(c) *Burley Tobacco*

19. There was a slight recovery of Burley production in the Eastern Province, interest being shown mainly by European growers. The trend of production over the last few years is shown in the following table:

BURLEY TOBACCO PRODUCTION IN THE EASTERN PROVINCE

Season		<i>African</i> (lb. sold)	<i>European</i> (lb. sold)	<i>Total</i> (lb. sold)	<i>Average Price</i> (pence per lb.)
1948-49	...	150,221	28,546	178,767	30.198
1949-50	...	264,000	63,000	327,000	26.694
1950-51	...	192,000	61,000	252,000	20.469
1951-52	...	24,000	54,180	128,180	28.226
1952-53	...	20,696	85,861	106,557	29.560
1953-54	...	44,774	55,782	100,556	25.970
1954-55	...	6,876	150,268	157,144	25.120

20. The decline in African production is due to disappointment at the comparatively low cash return compared with the returns for maize and groundnuts which are less trouble to grow. Efforts are being made to reorganise the industry so as to reduce the high overhead costs incurred by the co-operative marketing organisation in producing seedlings. There is a keen demand for Eastern Province burley tobacco on the Limbe floors and it is considered that there is a definite place for moderate production in the economy of the Province.

Wheat

21. Local production, grown entirely under winter irrigation, totalled 232 tons, this is approximately 1 per cent. of annual territorial requirements. The local subsidised price remains at 70s. per bag inclusive of cost of bag, against a landed cost for imported Australian wheat of around 56s. per bag. It is Government's policy to sustain producer interest in this crop, the consumption of which is steadily increasing throughout the Federation. Work continues upon the breeding of a summer wheat suited to Northern Rhodesian conditions, and the irrigation and cropping potential of the Kafue Flats is being investigated with wheat production in mind, but it must be some years before local projects have any appreciable effect upon the supply position.

Rice

22. The season was more favourable than the last for rice, some 3,756 bags of paddy and 383 bags of hulled rice were marketed in the Eastern Province, and 1,200 bags of paddy in Barotseland. There was a small production from the shores of Lakes Tanganyika and Bangweulu, also from the North Western Province, which finds its way to the Copperbelt. The consumption of rice is steadily increasing in many parts of the Territory, particularly in Barotseland. Surplus production is more or less adequate for internal demands.

Small Grains

23. Small surpluses of Finger Millet and Sorghum are available from African subsistence production in various parts of the Territory outside the maize belt. The demand for small grains is not very great, and this kind of production is not unduly encouraged.

Groundnuts

24. Groundnuts are commercially produced in the North-Western and Eastern Provinces. Production from Balovale, Kabompo and Kasempa sent to the Copperbelt totalled around 7,000 bags which was roughly double the production in 1954. The Eastern Province is rapidly becoming the most important groundnut producing area in the Territory and in spite of a reduction in price from £50 to £45 10s. per ton, which was announced well before the planting season, production has been well maintained at over 50,000 bags as shown district by district in the following table:

GROUNDNUT PRODUCTION IN BAGS OF 180 LB., 1951-55

Season	<i>Fort Jameson</i>	<i>Katete</i>	<i>Chadiza</i>	<i>Petauke</i>	<i>Lundazi</i>	<i>Total</i>
1951-52	900	900*	—*	1,200	1,250	4,250
1952-53	6,000	7,500*	—*	12,000	890	26,390
1953-54	22,122	10,350*	—*	26,350	355	59,177
1954-55	11,789	9,877	14,646	15,937	915	53,164

*Figures for Chadiza 1951-54 included in Katete totals.

The Maize Control Board was responsible for disposing of the groundnut crop. All local demands for ration nuts and local oil expression were fully met and a small export overseas was profitably made from railhead at Salima through the port of Beira.

Pulses.

25. The main interest in pulses throughout the Territory is for African subsistence. There is a considerable demand for beans of the *Phaseolus* type for labour rations, but these do not thrive under Northern Rhodesian conditions. A surplus of nearly 4,000 bags of cowpeas was produced in the Eastern Province, but the demand for these at the price at which they can be offered is very limited.

Potatoes and Onions

26. Limited quantities of potatoes are grown in the Lusaka, Broken Hill and Chisamba areas of the Central Province and at Livingstone and Mazabuka in the Southern Province. Five hundred acres of main crop potatoes yielded an average of 27.3 bags per acre (150 lb. bags) and 564 acres of irrigated potatoes yielded at the rate of 16.2 bags per acre. Onions are grown under irrigation at Chisamba, in the Chalimbana Valley and at Livingstone and Choma. Supplies of both onions and potatoes are inadequate to meet local requirements which must be made good by importation from the South.

Vegetables

27. There is a considerable urban demand for vegetables throughout the country, and a useful trade is carried out at prices varying from 6d. to 1s. 6d. per lb. On the Copperbelt it is usual for the produce to be hawked by African producers from door to door which competes severely with producers catering for organised markets.

Cassava

28. The main trade in cassava meal is between Balovale district in the North-Western Province and Barotseland. Exports dropped during the year by about a half to 500 tons. Cassava is essentially an African subsistence crop grown widely in the Northern and North-Western Provinces. It is of special value as a famine reserve.

Cotton

29. European production on the Plateau has dropped out almost completely and production is now confined to the Luangwa Valley in the Eastern Province where growing conditions were favourable during the year. Cotton has a special value as a cash crop in this area: 760 growers produced 76,500 lb. of seed cotton which realised a price of 5d. per lb. for clean cotton and 2½d. for stained. Insect pests were successfully controlled by D.D.T. dusting, and yields of over 400 lb. per acre were obtained in the Fort Jameson part of the valley.

STATISTICS OF EUROPEAN AGRICULTURE

30. The Department has again been responsible for collecting statistics of European agriculture which are passed to the Central African Statistical Office in Salisbury for analysis. The total value of European agricultural products was £5,354,000 for the year 1954, the last year for which figures are available. This was made up of crops, £4,225,000 and pastoral products, £1,129,000. The trend of development is shown by the following figures:

	1950-51	1951-52	1952-53	1953-54
Total number of farms ...	1,099	1,130	1,268	1,369
Total area of farms (acres) ...	4,136,156	4,571,668	4,599,000	4,600,000
Total area under cultivation (acres) ...	191,896	190,489	216,738	220,139
Total area in planted maize (acres) ...	102,185	104,542	110,506	116,722
Total area green cropped (acres) ...	36,107	29,162	38,338	48,441
Total area under irrigation (acres) ...	3,902	3,972	5,051	?
Total area planted in tobacco (acres) ...	22,290	23,806	22,107	15,568
Number of cattle ...	127,387	121,395	129,196	116,000
Number of sheep and goats ...	6,511	7,061	5,999	7,000
Number of pigs ...	6,614	7,808	8,739	10,000
Fertilisers used (short tons) ...	6,574	7,545	9,754	11,195

PART II.—WORK OF THE DEPARTMENT

Each generation for the next

Prepares a richer yield.

[HYMN 532, A. AND M.]

POLICY AND ORGANISATION

31. The policy of the department, epitomized in the words above, has continued to be that of encouraging the development and stabilisation of agriculture to ensure a reasonable measure of territorial self-sufficiency in essential food supplies combined with as high a level of permanent rural prosperity and development as possible. To further this purpose the Department is equipped and organised to carry out investigations by surveys and experiments in the field and laboratories, and to provide conservation and advisory services for both European and African farmers. The main sections into which the department is divided are as follows:

- (a) Headquarters Administration.
- (b) Tobacco Services.
- (c) Conservation Services.
- (d) Research and Specialist Services.
- (e) Provincial and District Advisory Staff.

Staff

32. Details of personnel and changes during the year are shown in Appendix I. Shortage of professional officers has continued to be a handicap and a source of embarrassment at a time of rapid rural expansion. Only eighteen Agricultural Officers have been available out of an establishment of twenty-six. Four probationers are at present undergoing post-graduate training at Cambridge and Trinidad but will not be available until late in 1956 and 1957. Uncertainty regarding impending federal changes has undoubtedly had an unsettling effect upon the outlook of the staff and it is to their credit that in spite of this an excellent year's work has been achieved.

Federal Changes

33. With effect from 1st January, 1956, the Tobacco and Conservation Sections of the Department, with a number of Agricultural Officer posts, will be transferred to Federal control to serve non-African agriculture exclusively. The balance of the Department remaining with the Territorial Government will similarly serve African agriculture except in regard to such investigational field and laboratory work which does not lend itself to sub-division upon a racial basis. The guiding principle observed in the sub-division of staff and funds was that officers serving entirely, or mainly, non-African interests on 1st January, 1956, should be seconded or transferred to the Federal Ministry of Agriculture, with the addition of such extra posts as would be needed to enable the two specialised sections—Conservation and Tobacco—to function as a departmental unit.

Special Investigations

34. The year has been remarkable for the number of fact-finding investigations which have been carried out by visiting scientists and by officers of the Department. A brief outline of the more important of these is given below:

(i) *Copperbelt Land Use Survey*

35. A team consisting of an Agricultural Officer, Soil Scientist and Ecologist assisted by the Agricultural Economist and field and laboratory staff have completed a detailed land use survey covering approximately 3,000 square miles on the Copperbelt. Alienation of Crown land has been frozen for the two-years duration of the survey, and it is hoped to submit a comprehensive plan for Government's consideration at an early date having regard to the requirements of the mining industry, agriculture and forestry.

(ii) *F.O.A. Grassland Mission*

36. Two American pasture authorities, Messrs. C. R. Enlow and W. L. Dutton, accompanied by the Pasture Research Officer, toured the Territory extensively during the early part of the year and reported in April upon the utilisation and improvement of natural and planted pastures. They recommended greater attention to research, to management and culling in African areas, and to the need for an improvement in fencing, water supplies and winter feed generally.

(iii) *Ngoni Land Use Survey*

37. An important agro-economic and sociological study was completed during the year by a team consisting of an Administrative and an Agricultural Officer in the densely populated Ngoni Reserve near to Fort Jameson, a problem area covering some 200 square miles in the Eastern Province.

(iv) *Economic Survey of Commercial African Farming in the Sala Reserve*

38. This investigation was carried out by the Agricultural Economist and a Principal Agricultural Supervisor into the economy of African farming in a maize-growing area to the west of Lusaka. The report revealed a comparatively high level of living and startling capital investment by commercial African farmers averaging £466 in the case of farmers registered under the African Farming Improvement Scheme, and £326 for those outside it. The annual cash disbursement of an average farm family of five people is shown to total around £60 per annum with, in addition, approximately £20 worth of home-produced food, figures which it would be hard for many urban wage-earners to approach.

(v) *Investigation into African-owned Tractors in the Southern and Central Provinces*

39. The Agricultural Economist obtained preliminary information upon the sixty-two tractors in African ownership in the two maize-growing provinces of the Territory. The majority of tractors were purchased second-hand. Few owners have any idea of their expenditure upon fuel and repairs. Eighty-one per cent. of the tractors purchased are in running order and the majority of owners expressed themselves as satisfied with their investment. The investigation will be carried further at a later date.

(vi) *Resettlement Plans, Zambezi Hydro-Electric Scheme*

40. Attention has been given as a matter of some urgency to the planning of reception areas for the 28,000 people of the Plateau Tonga tribe living in that part of the Gwembe Valley on the north bank which will be inundated with the rise in the lake behind the Kariba hydro-electric dam. Planning and mapping are greatly facilitated by the use of aerial photographs supported by ground traverses.

(vii) *Chirundu Sugar Investigations*

41. Soil surveys in an area seven miles back from the Zambezi River below the Kariba Gorge indicate that some 8,000 acres of irrigable land suitable for sugar-cane can be served by pumping from the river. A draft scheme has been prepared for Government's consideration envisaging the formation of a public Corporation in which Government holds the majority of the shares, which would include provision for the production of cane by some form of peasant farming scheme. The development of this scheme has special significance in relation to the resettlement and general economic problems in the rest of the valley.

(viii) *Kafue Flats: Irrigation Survey*

42. A firm of Dutch consultants was employed by the Rhodesia Selection Trust to investigate the irrigation potential of the Kafue Flats. The field work has been completed but the report is not yet available. It is understood, however, that indications are sufficiently favourable to justify the establishment of a pilot scheme. It is hoped that the development of irrigation on the Flats will one day make a substantial contribution to the wheat supplies of the Federation. It will also be important for the production of fodder crops and rice.

SERVICES FOR EUROPEAN AGRICULTURE

General

43. In spite of some complaints to the contrary, European farmers have been reasonably well served during the year. The establishment of the Conservation Section was increased to ten Conservation Officers and ten Conservation Supervisors under the Chief Conservation Officer, supported by mechanical and workshop staff. The Tobacco Section has consisted of four Assistant Tobacco Advisers under the Chief Tobacco Adviser, with two Tobacco Supervisors in charge of experiment stations. In addition Headquarters staff, including the Agricultural Economist and the Senior Agricultural Officer (Irrigation), Provincial Agricultural Officers and Specialist Officers from the Research Station, have been able to render considerable service, both in the field and in committee. In developed countries, advisory services on this scale would be considered lavish for 1,300 farmers. It is appreciated, however, that the development of a new country brings forward many unusual problems with a need for extra services. Work on these problems benefits not only the individual farmers or group of farmers immediately concerned, but contributes much to the overall agricultural development of the country in African as well as European areas.

Conservation Services

44. The regional conservation planning scheme, which came into operation on the 1st July, 1954, for a three-year experimental period has made excellent progress during the year under review. With the exception of Mkushi, Mwinilunga and Abercorn all European farming areas have now been aerially photographed and prints to a scale of 1: 20,000 are filed in the conservation planning offices at Lusaka and Choma.

45. Mapping and planning have been completed on 335,385 acres covering eighty-nine farms in the following six regions: Upper Kaleya, Middle Kaleya, West Lusaka (Cheta River), West Lusaka (Chilongolo River), Lower Kaleya and North Broken Hill. Field work is almost complete in these areas: an analysis of the work shows the following comparison with previous years' achievements—

SUMMARY OF CONSERVATION WORKS ON LINE OF RAIL IN EUROPEAN AREAS

	1952	1953	1954	1955
Area pegged for farmers (acres) ...	1,358	3,000	3,000	5,590
Storm drains (yards)	31,038	27,650	53,120	141,950
Contour Ridges (yards)	62,190	136,486	169,900	458,000
Waterway guide banks (yards)...	11,480	10,100	—	35,400
Fence lines and fireguards (miles) ...	17	83	410	412
Roads (miles)	2	10½	49	58
Subsoiling (acres)	304	—	—	—
Bush clearing (acres)	1,305	3,914	3,214	6,416
Windrowing (acres)	35	373	—	602
Dams (number)	9	9	20	38
Dams capacity (million gallons) ...	30½	22	231	143
Small buffer dams, etc. (number) ...	82	—	32	53

It will be noted that as a result of regional planning the work carried out during the year represents a considerable increase upon previous performance.

46. The cost analysis is not available at the time of writing but it is known that costs have been kept within the limits prescribed by the Legislature, namely that no plan should exceed more than 10s. per acre, of which not more than 25 per cent. should qualify for 100 per cent. subsidy without specific authority.

47. Mapping and planning are well advanced in respect of the Chalimbana Valley, east of Lusaka, and the Mazabuka Valley, totalling together an area of 242,000 acres.

48. It was gratifying to note in discussion at the meeting of the Southern African Regional Committee for the Conservation and Utilisation of the Soil held at Pretoria in November, 1955, that Northern Rhodesia is ahead of all other territories in Southern Africa in this fundamental approach to conservation planning: this advantage is attributable to the basic ecological work carried out in this Territory by C. G. Trapnell and to the fruits of a visit to the United States of America made by the Chief Conservation Officer, Mr. J. N. Clothier, in 1952, to whom the credit is due for regional planning.

49. At the present rate of progress it will take about eight years to complete regional conservation in all Crown land areas. Priorities for the rest of the programme are being discussed with the Natural Resources Board. In areas not at present included in a regional plan, conservation work continues, albeit on a reduced scale based upon an interpretation of aerial photographs; thus the way for future comprehensive planning is prepared.

50. The accounts of the Conservation Section have been put on to a commercial basis from 1st July, 1955, and although they have not yet been analysed the indications are that charges, which were raised by 10s. per hour in May, will have to be raised again. The present tractor charges which include the appropriate implements are:

			£	s.	d.	
D.8	...	...	6	3	4	per hour
D.7	...	...	5	3	4	per hour
D.6	...	...	4	3	4	per hour
D.4	...	...	3	3	4	per hour.

It is worthy of note that the heavy equipment has achieved more hours of work during the year than ever before, particularly during the second half of the year. The average number of hours worked over the twenty units was 1,045 hours against the basic expected of 1,000 hours. This is a tribute to the good work now being achieved by the mechanical staff, the efficiency of the administration, and the efficiency of planning the field work consecutively down a catchment area.

51. Many calls have been made during the year upon the time of the Conservation Officers for special reports in connection with Land Board and Natural Resources Board affairs. The Conservation Planning Officer for the Southern Region has also given special assistance with the mapping and planning for Gwembe resettlement in connection with the Kariba Hydro-Electric Scheme.

Miscellaneous Services

52. In addition to the regular services provided for European farmers by the Conservation and Tobacco sections, specialist advisory services have been supplied on request by the Pasture Research Officer, Plant Pathologist and Senior Agricultural Officer (Irrigation). In the Mkushi Block, Mr. Unwin Moffat, O.B.E., retired Senior Agricultural Officer, has rendered invaluable service as an adviser on a part-time basis. The Government Farm at Chalimbana has continued to be run as a European demonstration dairy unit. Considerable quantities of grass planting material have been supplied from agricultural stations on the line of rail.

SERVICES FOR AFRICAN AGRICULTURE

General

53. Two new stations staffed with Agricultural Officers were opened during the course of the year, namely, Kalomo and Balovale. In addition to the overall supervision by officers in charge of provinces there is now a total of eight Agricultural Officers, thirty-four Agricultural Supervisors, 230 African Agricultural Assistants and 297 Capitaos providing field advisory services in African areas, together with African Agricultural Training Centres at Monze in the Southern Province and at Lunzuwa in the Northern Province. The distribution of agricultural stations, province by province, is as follows:

Southern Province	...	8	Mapangazia, Magoye, Monze, Kanchomba, Gwembe, Mapanza, Kalomo and Mochipapa.
Central Province	...	10	Broken Hill, Mumbwa, Keembe, Muchenje, Muswishi, Serenje, Mkushi, Mukulaikwa, Chalimbana and Shibuyunji.
Eastern Province	...	6	Fort Jameson, Chadiza, Kalichero, Lundazi, Petauke and Katete.
Northern Province	...	6	Kasama, Lunzuwa, Isoka, Luwingu, Kawambwa and Fort Rosebery.
Western and North-			
Western Province	...	4	Ndola, Kasempa, Kabompo and Balovale.
Barotseland	...	2	Namushakende and Mankoya.

54. Provision is included in the revised Development Plan for the opening of new stations at Namwala, Sesheke and Chinsali, and for the expansion of services in the Gwembe district. Efforts have been concentrated upon controlling soil erosion and stabilising production by the introduction of sound farming methods. Development is necessarily slow and fraught with disappointments. The scope for improving farming efficiency in African areas is tremendous as a comparison of crop and stock production between the improved and the average immediately shows. Nevertheless there are encouraging signs of progress in all parts of the Territory, but particularly in the Eastern Province.

55. Local agricultural shows, and farmers' days on agricultural stations and on the farms of improved farmers, are extension techniques of which good use has been made in all provinces during the year. Continuity and enthusiasm of the field staff with programmes of work based upon the needs of their areas, as shown by surveys, provide the key to success, which is the confidence of the people. Progress of the major activities of the Department in African areas is outlined below.

Soil and Water Conservation in African Areas

56. Whilst the people in all parts of the Territory are rapidly accepting a money economy and utilising their soil to produce new wealth, there are few signs of any appreciation by the leaders in this generation of their responsibilities to posterity for the soil. Educational processes are slow, and mistrust of our motives emphasises the need for continuity in staff and policy which is our constant aim.

Southern Province

57. Some 291 miles of narrow base contour ridges were constructed with midmounted-terraces on Ferguson tractors. Over half of this work was carried out in the densely populated headwater area at Mapangazia. A further seventy-eight miles of contour ridging was repaired. Fifty-four miles of cultivation limits have been pegged to protect "dambos" in Magoye area and 160 miles of contoured grass strips have been demarcated at Magoye and Mapangazia. Over 800 check dams were constructed in gullies and two dams were made in the Kanchomba area at Nyanga and Matolokesi.

58. The Governor made orders during the year to limit stocking in the grazing area of the Mapangazia pilot conservation scheme, and paddocks for controlled grazing were fenced. Culling orders were also made in respect of parts of Mazabuka and Choma districts but these have not yet led to the de-stocking which was hoped for. Commercial farming activities are putting considerable strain upon the soils of the Southern Province, of which African opinion seems to be completely unaware. The valley escarpment hills are being rapidly devastated with no attempt at control by the native authorities, and no agricultural staff is at present available to take the initiative. There is great need for an educational drive in these matters and for regional conservation planning throughout the Province.

Central Province

59. The pressure of population is not so great in this Province and the overall need for conservation measures is less acute. Small dams and weirs have been constructed at Keembe and Mumbwa and near the local Government school at Chalimbana. Contour ridges and dambo lines have been marked in the Soli, Sala and Keembe areas wherever improved farming is practised. A controlled grazing trial has been laid down on 6,000 acres of the Sala Reserve contiguous with European farms in the West Lusaka regional conservation plan: the native authority, after agreeing to the experiment, have, at the time of writing, expressed a disinclination to co-operate.

Eastern Province

60. With the exception of parts of the Angoni Reserve, such good progress has been made during the year with the construction of contour ridges that the Chief Agricultural Officer is able to report that all plateau villages in the Province are now practising contour cultivation. Forty-four thousand five hundred acres were protected during the year making a total of over half a million acres protected in the Province as a whole. It is to be noted, however, that mechanical control is only the beginning; the position must now be consolidated by the general adoption of sound husbandry methods. The co-operation of native authorities has much improved this year. Routine anti-erosion measures have included the demarcation of dambo cultivation lines, storm drains around the base of the hills, the prevention of cultivation in unsuitable places, and generally the encouragement of the early burning of the bush. In the area of the Angoni Chief Kapatomoyo, some 3,000 dry stone weirs and 500 brushwood silt traps were constructed by the people.

Western Province

61. Some attention has been given to contouring in gardens in Ndola rural area and to the protection of dambos.

North-Western Province

62. The resettlement of a proportion of the population from the Kafue headwater area in Solwezi district has proceeded satisfactorily. The passing of orders by the Manyinga Native Authority in Kabompo district to control cultivation on steep slopes represents an important advance. Fortunately the pressure of population is relatively slight throughout this important watershed province and the enforcement of early burning of the bush is the simplest and most applicable conservation measure.

Northern Province

63. Early burning has been reasonably well carried out during the year. Some forty-two miles of narrow-based contour lines have been demarcated in gardens throughout the Province but mainly in Isoka and Abercorn district. The lines for sixteen water-furrows have been marked during the year in the Kasama, Mpika and Chinsali districts. It is noted that the people tend to be suspicious of this kind of development which is yet another indication of the need for winning the confidence of the people.

Barotseland

64. Conservation in Barotseland consists mainly in controlled drainage of the potentially productive "Sishanjo" peat soils lying on the margin of the Zambezi flood plain. The introduction of sound methods of land usage, to ensure optimum sustained yields and variety in production from the interesting soils of the flood plain, has also received attention. Reports indicate encouraging growth of confidence of the Paramount Chief and the Kuta in the work of the Department.

African Farming Improvement Schemes

65. As explained in previous annual reports, these schemes apply in the Maize Control Board areas of the Central and Southern Provinces on the line of rail, and in the area of the Eastern Province Agricultural Produce Board; they are financed from a levy on maize delivered to these boards. Representative committees administer the funds within their respective areas.

Southern and Central Provinces

66. This is the first year for which commercial audited accounts are available. The Statement of Income and Expenditure for the year ending 31st May, 1955, shows the income of the fund to have been £173,330, with expenditure amounting to approximately half this, made up as follows:

						£
Bonus to Improved Farmers	...	...	...	...	...	27,716
Subsidies on Carts, Fertilisers, Seeds, etc.			...	...	...	29,102
Soil and Water Conservation Works	...		...	...	...	28,391
Grants to Native Authorities	...	...	...	...	...	1,360
Administrative Expenses	...	...	...	...	...	728
Irrecoverable Loan	...	...	...	...	...	106
TOTAL	...	...	...	...	...	£87,403

Approximately £86,000 was carried to the Balance Sheet which shows the value of Fixed Assets to be £142,644, and Current Assets, £243,554.

67. The Administering Committee met on the 28th April, 1955, to consider estimates of expenditure for the 1955-56 financial year, and matters of general policy. Owing to the agricultural staff position the committee has not been able to spend the funds as readily as it would have liked. It is anticipated, however, that all available funds will be required when regional conservation planning is started in African areas. A brief summary of the year's activities is given below.

(a) Acreage Bonus to Approved Farmers

68. Bonuses are paid at the rate of 27s. per acre for Grade I farmers and 17s. per acre for Grade II farmers. In the Southern Province 773 farmers qualified for a total bonus of £15,915, compared with 604 farmers last year. In the Central Province 338 farmers qualified for £11,704 total bonus compared with 212 farmers in 1954. Perhaps the greatest value of the registered Improved Farmers is the excellent demonstration they provide of sound farming methods which has considerable influence upon the practise of their neighbours. Their farms are made use of as result demonstrations on Farmers' Days.

(b) Subsidies on Carts, Fertilisers, Seeds, etc.

69. A total of over 900 carts, receiving a subsidy of 50 per cent. of their original cost, was sold in the Southern and Central Provinces during the year. An arrangement has been entered into with Messrs. Harold Poole Limited for the distribution of carts, thus relieving Maize Control Board and departmental staff of a considerable burden. The organisation for the distribution of carts has special significance in the Southern Province where the use of sledges is banned by native authority order with effect from 1st January, 1956. The selling price of carts to the African farmer is £20 for an iron-tyred cart and £30 for a cart with rubber

tyres. The fund has assisted farmers to obtain fertilisers and improved seed supplies at cost price. One hundred and eighteen tons of sulphate of ammonia were sold in the Central Province and ninety-three tons of superphosphate: in the Southern Province seven and a-half tons of sulphate of ammonia and 146 tons of superphosphate.

(c) *Conservation Works*

70. The sum of £28,391 has been spent in the Southern and Central Provinces during the year, carrying out the conservation works outlined in paragraphs 57–59 above.

(d) *Loans*

71. Important assistance has been given to Improved Farmers by making available a sum of £4,000 for each province to provide farming capital. The loans are administered provincially by small committees upon which the native authorities are represented. The demand for loans increases annually, indicating clearly the need for available capital as a subsistence farming economy gives way to commercial farming. Two hundred and eighty-nine loans were granted in the Southern Province totalling £3,817, used mainly for the purchase of carts, implements, spare parts, fertilisers and seeds. In the Central Province 147 loans have been issued totalling £2,065. The main security for the loans is the expected acreage bonus. Repayments have been very satisfactory. The administration of these loans, however, is very time-consuming, and it is hoped to introduce some alternative organisation at an early date.

Eastern Province

72. The following summary of the activities of the Eastern Province African Improved Farming Scheme is extracted from the Chief Agricultural Officer's Report:

“The fund continued to be managed on the same lines as in previous years and is proving its worth in the development of the Province. The record maize crop boosted the fund's finances by £16,000 approximately. The audited balance sheet up to 30th June, 1955, showed total balance of receipts over expenditure of £40,250. For the year to 30th June, expenditure amounted to approximately £14,000 which was only £2,500 less than income for the same period. The principal items of expenditure are: manuring bonuses—£2,400; cart subsidies—£6,200 on 368 carts; subsidies on seed and seed dressings—£1,100; subsidies on 186 ridging ploughs—£1,000; improved kraal bonuses—£300; soil conservation—£500. Loans to individuals for stumping gardens were made to the extent of £1,400 and £1,000 was used to finance the supply of hand-operated groundnut shellers.”

Peasant Farming Scheme

73. This scheme provides loan funds and guidance for groups of farmers and, in certain circumstances, for individuals, subject to stipulated conditions in agreement with native authorities, to enable them to establish themselves as commercial farmers. The scheme is territorial in its scope, financed from a revolving fund provided by Colonial Development and Welfare loan funds, and administered by the Commissioner for Native Development in co-operation with Area Development Teams and the Department of Agriculture. Peasant farming operates generally outside the scheduled areas of the Maize Control Board where the facilities of the African Farming Improvement Scheme are available. Accessibility to markets, availability of soils of reasonable fertility and adequate water supplies are pre-requisites for success. Farmers lacking capital are best suited by taking up farms in an organised Group or Block.

74. The advantages of the scheme have also been successfully extended to established individuals in suitable circumstances who are prepared to accept guidance and control in such matters as field layout and crop rotations. Progress has been steady during the year, particularly in the Eastern Province.

75. In the Eastern Province the number and distribution of Peasant Farmers at the close of the year is shown in the following table:

NUMBER OF PEASANT FARMS IN EASTERN PROVINCE							
		<i>Petauke</i>	<i>Katete</i>	<i>Kalichero</i>	<i>Ngoni Areas</i>	<i>Chadiza</i>	TOTAL
1950–51	B ...	—	26	—	—	—	26
	I ...	—	—	—	—	—	—
1951–52	B ...	—	26	—	8	—	34
	I ...	—	—	—	—	—	—
1952–53	B ...	16	39	10	10	—	75
	I ...	6	4	—	—	—	10
1953–54	B ...	33	60	13	10	—	116
	I ...	30	15	3	2	—	50
1954–55	B ...	35	82	20	10	—	147
	I ...	47	28	15	5	7	102
1955–56	B ...	69	102	36	16	—	223
	I ...	61	63	19	33	19	195

(Note.—B=Block Farms; I=Individual Farms)

76. The average known cash income of the above farmers derived from produce sold through organised marketing channels varied from £13 for first year farmers in Petauke to £89 per farm for established farmers in the same area. In addition, adequate food for the family was retained, and a surplus to barter for labour next year.

77. An important development in the Petauke District was started in the 1954-55 season when an entire village agreed to put the whole of their cultivated area upon a sound rotational basis, including the use of fertilisers and kraal manure, with the most encouraging results. In the 1955-56 season, seven more villages in Petauke and two in Katete have followed this example. The Senga/Ambo Native Authority are now giving favourable consideration to the passing of orders to require all villages to adopt this advance whenever the village site is changed.

78. One weakness of the Peasant Farming Scheme for which a solution must be found is the provision of grazing lands for peasant farmers. There seems little doubt that some day grass must come to be regarded as a crop with paddocking either on an individual or a communal agistment basis. There is no slackening in the demand for peasant farms in the Eastern Province. Two hundred and thirty new farms have already been surveyed for opening in 1956.

79. In the Central Province peasant farming has had a varied year, largely because in three out of the four areas conditions tend to be marginal at present for commercial agriculture. One hundred and twenty-one farmers were in operation at the end of the year compared with 120 in 1954. At Serenje, where soil conditions are poor, the Provincial Team has recommended the writing-off of 60 per cent. of the loan for stumping and clearing, an amount totalling £2,460 for the seventy-two farmers involved. All the farmers in the Bulila Group have now been moved to Sasa where soil conditions are better. Progress of peasant farming in Serenje was critically reviewed during the year, and it is hoped that a new approach will produce more satisfactory results. At Mumbwa trypanosomiasis in the cattle has created difficulties for the fourteen peasant farmers and held up progress; a renewed attempt is being made with the help of "Antrycide". At Muswishi, soil conditions are poor, and the group of ten farmers makes little advance: some hopes are held out for Turkish tobacco as a cash crop. The Munsakamba block of twenty-seven farmers, near the new Mkushi Boma, continues to flourish and two new blocks are being opened in the district.

80. In the Western Province the two pilot peasant blocks have continued in Ndola Rural District; these are at Nyenyeshi and Fiwale with twelve and fourteen farmers respectively. The group at Nyenyeshi, which came from Southern Rhodesia, is gaining in strength and thought likely to be able to repay its loans; at Fiwale, where soil conditions are poor and water supplies difficult, the picture is less encouraging.

81. In the Northern Province 101 peasant farms were occupied in eleven blocks distributed through eight districts, compared with seventy-eight farmers in five blocks last year. The year has been one of consolidation and cautious expansion. Incomes have varied from under £10 per holding to over £40. More attention has been given to crop rotations and soil fertility than in the past. The aim is to make the scheme an obvious success and so to attract some of the enterprising individuals who are thought to be holding back at present. No progress has been made with the three large extended family group farms established last year at the request of the Bemba Native Authority, in fact only a man and his wife and children have gone to the 150-acre units demarcated.

82. The tendency for individual families to break away from their villages and to establish scattered settlements continues unabated in the Northern Province: over 900 such units have been under observation and mapped. Unfortunately the agricultural methods followed leave much to be desired and the native authority is unwilling to exercise any control: land use and land tenure problems go hand in hand and posterity suffers from neglect.

83. In Barotseland three farmers averaged incomes of £20 in their first year in the Lukalanya Pilot Peasant Farming Scheme, with rice as the main cash crop; eight more farmers have been established. Progress has not been so rapid as desired but a good start has been made and valuable experience has been gained.

School Farms and Gardens

84. The department fully appreciates the importance of influencing the literate section of the next generation and to this end co-operates closely with the Department of African Education in providing guidance in agricultural matters in the curricula of all rural schools in areas where agricultural staff is posted, particularly in connection with school farms and gardens.

85. A successful short course for thirty-four teachers was organised at the Agricultural Training Centre, Monze, and a six-months' course was arranged for nine married teachers. Eleven teachers started on the Second Teacher Course on 10th August, and will work through until June, 1956.

Agricultural Education—African

86. The sixth session at Monze Agricultural Training Centre ended in June, 1955; of the thirty-two students who started the course in 1953, twenty passed their final examinations and received certificates. The seventh session started in November with thirty-seven students. Competition for places in the school is becoming keener, which makes possible greater selectivity than in the past; it is hoped that this will reduce the wastage.

87. At the Lunzuwa Agricultural Training Centre in the Northern Province, eighteen students in the third session successfully completed their course, out of twenty-six who entered in 1953. There were five failures and three dismissals. Only twenty-three students in the fourth session out of a total of thirty-six qualified for the second year of their course. For the fifth session, which started in November, 1955, nineteen students were in residence after three months' practical experience. Three refresher courses were held at Lunzuwa during the year, attended by fifty-seven Native Administration Agricultural Kapasus.

Agricultural Education—European

88. In the departmental training schemes, the three pupil trainees, one tobacco and two conservation mechanics, made good progress with their third year of training, and will in all probability be suitable for employment in 1956. An additional mechanical trainee was appointed during the year. The demand for this training has been disappointing. The future of the scheme will now rest with the Federal Department of Conservation and Extension.

89. The progress of Northern Rhodesian students at the Gwebi Agricultural College in Southern Rhodesia has been uneven during the year. Of the four who entered in 1954, two failed to complete the year and the other two failed to pass their first-year examinations. Three students only took advantage of the four places made available in October, 1955. It would seem that we send from Northern Rhodesia either medallists or students who fail to complete their courses. The demand for entry in 1956 and 1957 is encouraging, young men with good school records are coming forward and competition for places is becoming keener.

SPECIALIST SERVICES AND EXPERIMENTAL WORK

90. The Central Agricultural Research Station at Mount Makulu, situated on Upper Valley soil nine miles south of Lusaka, was officially opened by His Excellency the Governor, Sir Arthur Benson, on the 17th March, 1955. Field and laboratory demonstrations followed the opening ceremony to enable the guests, numbering around 150, to see the work in progress on the Station. The importance of this occasion cannot be over-emphasised; since the closing of the Central Research Station at Mazabuka during the economic depression in 1934, the Department has been severely handicapped by the lack of normal research facilities. The research station has been well described as the power house of the Department from which experimental work throughout the Territory is co-ordinated and controlled. A brief summary of research activities is given below. The details of research, it is proposed to publish in bulletin form.

Establishment of Central Research Station

91. Excellent progress has been made with the development of Mount Makulu during the year. Six additional units of accommodation have been built for European staff, bringing the total accommodation available now to eighteen, and two more houses had reached wall-plate level at the close of the year. Houses for two senior African members of the staff were also completed and eighteen labourers' cottages; in addition three laboratories were finished together with various farm buildings, stores and garages.

92. Good progress has also been made with the development of the farm. The milking herd of thirty-eight grade Jersey cows has settled down and is flourishing, and a flock of fifty-five cross-bred Merino X-Black-headed Persian sheep has been acquired for grazing trials. The season proved favourable for crops, the average yield of maize for the station was fifteen bags per acre, and fifteen acres of maize and velvet bean yielded 150 tons of first-class ensilage.

Specialist Staff

93. The arrival in December of Mr. J. Wilson as Chief Research Officer was an event of major importance for which we have had to wait four years; during this period the Deputy Director, Mr. Halcrow, has been directly responsible for developments. At the close of the year the specialist staff, in addition to the Chief Research Officer, consisted of: Pasture Research Officer, Ecologist, two Plant Breeders, Soil Surveyor, Agricultural Chemist, three Research Assistants, two Agricultural Officers, Farm Superintendent, Agricultural Supervisor, Building Foreman and clerical staff. Unfortunately there have been some staff changes during the year: the Agricultural Chemist, Dr. Pawson, transferred in June to Makerere College, Uganda, and was replaced in December by Mr. Vogt from Holland. The Plant Pathologist, Dr. Riley, left on transfer to Tanganyika in July, and a replacement is expected in March, 1956. The Agricultural Supervisor, Mr. F. Hyam, assisting the Pasture Research Officer, resigned in October and was replaced in that month by Mr. T. Davies.

SUMMARY OF SPECIALIST ACTIVITIES

Agricultural Chemistry

94. The main work of the laboratory has been the analysis of soil samples, for the farming public, for the Land Use Surveys on the Copperbelt and in the Ngoni Reserve in the Eastern Province, and in connection with the comprehensive series of fertilizer trials. Herbage analyses have also received attention.

95. In the field, fertiliser trials have continued throughout the Territory in maize-growing areas and earlier recommendations have been fully confirmed. In fifty-five trials out of seventy-seven a marked nitrogen deficiency has been shown and the application of 200 lbs. of sulphate of ammonia as a side dressing to maize after six weeks growth has given an average yield increase of 822 lb. grain per acre. With sulphate of ammonia at £30 per short ton and maize at 41s. per 200-lb. bag it will be seen that this is a very profitable operation. For best results a plant population approaching fifteen thousand plants to the acre is desirable. In only thirty trials out of sixty-seven was phosphate shown to be required. Maize leaf analyses have given a positive correlation with nitrogen requirements but not with phosphate.

Soil Survey

96. The field work of the Land Use Survey of the Copperbelt, started in March, 1954, was completed during the year. A total area of 3,000 square miles was traversed at mile intervals and soil and vegetation details were recorded and mapped.

Ecology

97. The main work during the year has been in connection with the Copperbelt Land Use Survey and with grass and legume investigations arising therefrom. Soil and vegetation studies on the Copperbelt have suggested the possibilities of more rapid land assessment from aerial photographs by a study of indicator plants, which unfortunately are not usually the dominant species. Plans have been made during the year for a reconnaissance in the Mumbwa triangle, west of Lusaka, and vegetation studies on the Kafue Flats have been started.

Pasture Research

98. The collection and identification of local pasture plants continues, together with work on plant introductions centred at Mount Makulu. Attention has been given to problems of seed production and pasture establishment, both upon agricultural stations throughout the Territory, and in co-operation with selected farmers. Numerous observation plots have also been established.

Plant Pathology

99. In addition to the compilation of the Plant Diseases List for the Territory and general advisory work, the main work of this Division has been centred upon tobacco diseases, particularly Anthracnose, a seedbed disease for which "Zineb" has been found to give satisfactory control: minor element deficiencies have been investigated, particularly boron, in the Eastern Province. Useful preliminary work has also been carried out with weedkillers and arboricides. M.C.P.A. as a pre-emergence spray has proved itself used at 1-lb. per acre acid equivalent, but it has been shown that cultivation has a value in addition to weed control.

Plant Breeding

100. Work has continued upon the selection of varieties of wheat likely to provide suitable parent material for the breeding of a summer wheat suited to Northern Rhodesian conditions. Twenty-two selections have been made from the 500 varieties under trial the previous year. Studies have continued with groundnuts and other pulses in an endeavour to find strains more suitable for local conditions. Various varieties of tomatoes have been under trial for disease resistance in the wet season.

Irrigation

101. An area of some thirty-five acres close to the Chiansi Lagoon on the Kafue Flats south-west of Lusaka, has been protected by embankment to provide for experiments to investigate the possibilities of crop production on this vast flood plain.

Tobacco

102. A comprehensive series of tobacco experiments has been continued with flue-cured tobacco at the two tobacco stations, Mochipapa, near Choma in the Southern Province, and Msekera, near Fort Jameson in the Eastern Province. Upon the results from these experiments the advisory work of the tobacco section of the Department has been successfully based. Trials have been conducted into the effects of various manurial treatments upon yield and quality; variety trials have been carried out to compare standard and introduced varieties, and investigations into priming, the control of sucker growth and the causes of dark coarse midribs. Experiments with disease control have been carried out in co-operation with the Plant Pathologist, mentioned above. Variety trials with Burley tobacco have been conducted at Msereka and Petauke in the Eastern Province. Samples of Northern Rhodesian tobacco were sent to the Cawthron Institute in New Zealand and to the Colonial Products Laboratory in London, in an endeavour to find the nature of an alleged "tang" in Eastern Province tobacco. Careful investigations by these institutions failed to reveal any defect. The results from tobacco experiments carried out during the last four years will be published shortly in bulletin form.

CONFERENCES, BOARDS AND COMMITTEES

103. Officers of the department have continued to play a full part during the year as members of official boards and committees. In one capacity or another the Department is represented upon the following:

Natural Resources Board.
Maize Control Board.
Copperbelt Screening and Advisory Committee.
African Farming Improvement Fund Committee.
Eastern Province Agricultural Produce Board.
International Red Locust Control Council.
Southern African Regional Committee for Conservation and Utilisation of the Soil.
Federal Interim Grain Marketing Committee.
Federal Standing Committee on Agricultural Production.
Federal Standing Committee on Prices and Markets.
Federal Research Committee.

Provincial and District Agricultural Officers also served as members of Provincial and Area Development Teams. The Director was nominated as an Official Member for the March and July meetings of Legislative Council.

LEGISLATION

104. The following *Gazette* Notices affecting the department were published:

General Notice No. 438—Producer Price of Maize.
General Notices Nos. 545 and 1122—Committee to Administer the African Farming Improvement Fund.
General Notice No. 737—Price of African Grown Maize.
General Notice No. 692—Producer Price of Wheat.
General Notice No. 1204—The Maize Control Board.
General Notice No. 1456—Subsidy on Transport of Fertiliser, Eastern Province.
General Notice No. 268—Eastern Province Agricultural Produce Board.
General Notice No. 1785—Eastern Province Agricultural Produce Board.
General Notice No. 1641—Land Board.
General Notice No. 333—Appointment to the Legislative Council.
General Notice No. 1198—Appointment to the Legislative Council.
General Notice No. 1637—Resignation from the Legislative Council.

The following Ordinances were enacted:

No. 13 of 1955—The Eastern Province Agricultural Produce (Amendment) Ordinance, 1955.
No. 16 of 1955—The Control of Bush Fires and Trespass (Amendment) Ordinance, 1955.
No. 55 of 1955—The Maize Control Board (Amendment) Ordinance, 1955.
No. 61 of 1955—The Non-African Agriculture (Transfer to the Concurrent List).

PUBLICATIONS

105. The following departmental bulletins and publications were published throughout the year:

Bulletin No. 8—*Crop Rotation in the Production of Tobacco*, by J. C. Collins and W. J. D. Watson.
Bulletin No. 9—*Tobacco Nurseries*, by J. C. Collins (Chief Tobacco Adviser).
Bulletin No. 10—*An Economic Survey of Commercial African Farming among the Sala of the Mumbwa District*, by A. M. Morgan Rees, Agricultural Economist and R. H. Howard, M.B.E., Principal Agricultural Supervisor.
Flue-Cured Virginia Tobacco Recommendations, by J. C. Collins (Chief Tobacco Adviser).
Report by F.O.A. Grassland Mission on Northern Rhodesia. (Cyclostyled.)

VISITORS

106. Sir Christopher Cox, K.C.M.G., Educational Adviser to the Secretary of State.
Professor G. E. Blackman, Director, Unit of Experimental Agronomy, University of Oxford.
Professor R. W. Steel, Lecturer in Economic Geography, University of Oxford.
Mr. L. H. Huizenga, Netherlands Agricultural Expert.
Professor Champion, C.I.E., D.S.C., M.A., Imperial Forestry Institute, Oxford.
Mr. J. Lea, Managing Director, Minsal Ltd., Northwich, Cheshire, England.
Mr. Cassidy, Chief Chemist, Minsal Ltd., Northwich, Cheshire, England.

IN CONCLUSION

107. Agriculture has made sound progress in all parts of the Territory during the year. I would like to pay tribute to the loyal support and the enthusiastic application to duty of all members of the staff of the Department, which has made this progress possible.

3rd March, 1956.

C. W. LYNN,
Director of Agriculture.

APPENDIX I

STAFF LIST AS AT 31st DECEMBER, 1955

HEADQUARTERS, LUSAKA

C. W. Lynn, M.B.E., DIP. AGRIC. (WYE), A.I.C.T.A., Director.
M. Halcrow, O.B.E., B.SC. (AGRIC.), DIP. AGRIC. (CANTAB.), A.I.C.T.A., Deputy Director.
C. E. Johnson, B.SC., DIP. AGRIC. (CANTAB.), A.I.C.T.A., Chief Agricultural Officer (on leave).
J. R. E. Hindson, B.A., A.I.C.T.A., Senior Agricultural Officer.
A. M. M. Rees, M.SC. (WALES), Agricultural Economist.
N. M. W. Irvin, Office Superintendent.
J. Meade, Assistant Accountant.
H. de B. Barwis, Assistant Accountant.
D. A. Grobecker, Clerk.
Miss G. M. N. Briggs, Stenographer.
Mrs. P. M. Harrington, Stenographer.
Mrs. J. Cobley, Stenographer.
Mrs. D. A. Lightfoot, Temporary Clerk (on leave).
Mrs. J. Graham, Registry Clerk.
Miss E. Owen Smith, Learner Clerk.
Mrs. G. D. de Goede, Temporary Relief Clerk.
Mrs. A. E. Hall, Temporary Relief Clerk.

SPECIALIST SERVICES

J. Wilson, B.SC. (BOTANY), Chief Research Officer.
J. H. Hinds, B.SC. (HONS.) (WALES), A.I.C.T.A., Pasture Research Officer, Central Agricultural Research Station, Mount Makulu, Lusaka.
B. E. Moulder, B.SC., Plant Breeder (Wheat), Central Agricultural Research Station, Mount Makulu, Lusaka.
J. Smartt, B.SC., DIP. AGRIC. (CANTAB.), D.T.A., Plant Breeder (General), Central Agricultural Research Station, Mount Makulu, Lusaka.
J. B. M. Vogt, B.SC. (CHEMISTRY), Agricultural Chemist, Central Agricultural Research Station, Mount Makulu, Lusaka.
R. B. Symington, B.SC., D.T.A., Agricultural Officer, Central Agricultural Research Station, Mount Makulu, Lusaka.
N. R. Brockington, B.SC., DIP. AGRIC., Central Agricultural Research Station, Mount Makulu, Lusaka.
Dr. K. F. Salmond (Senior Scientific Officer, seconded), Entomologist, Maize Control Board, Lusaka.
T. J. Greatrex, Farm Superintendent, Central Agricultural Research Station, Mount Makulu, Lusaka.
F. R. T. Hyam, B.SC., Agricultural Supervisor (on leave), Central Agricultural Research Station, Mount Makulu, Lusaka.
T. Davies, B.SC., Agricultural Supervisor, Central Agricultural Research Station, Mount Makulu, Lusaka.
Miss A. M. Lister, B.SC., Research Assistant, Central Agricultural Research Station, Mount Makulu, Lusaka.
K. L. Dubber, Research Assistant, Central Agricultural Research Station, Mount Makulu, Lusaka.
Elijah Mudenda, B.SC., African Research Assistant, Central Agricultural Research Station, Mount Makulu, Lusaka.
Miss A. M. Brodie, Learner Clerk, Central Agricultural Research Station, Mount Makulu, Lusaka.
Miss M. Booth, Clerk, Central Agricultural Research Station, Mount Makulu, Lusaka.
P. Lindeque, Building Foreman (seconded from Public Works Department), Central Agricultural Research Station, Mount Makulu, Lusaka.

LAND USE SURVEY TEAM

A. T. Wilson, B.SC., DIP. AGRIC. (CANTAB.), D.T.A., Agricultural Officer, Ndola.
Dr. A. O. Ballantyne, B.SC., PH.D., Soil Surveyor (on leave).
G. McI. Burnie, Agricultural Supervisor, Kambowa.
Mrs. A. R. Theaker, Temporary Clerk, Ndola.
Zacharia Gwanzura, B.SC., African Research Assistant, Ndola.

CONSERVATION SECTION

J. N. Clothier, DIP. AGRIC. (WYE), A.I.C.T.A., Chief Conservation Officer (on leave).
A. N. Beaumont, B.SC., Conservation Officer, Lusaka.
J. Mackenzie, B.SC., Conservation Officer, Choma.
G. L. Passanah, B.SC., Conservation Officer, Mazabuka.
E. L. G. King, B.SC., Conservation Officer, Mazabuka.
B. W. R. Wilson, B.SC., Conservation Officer, Lusaka.

CONSERVATION SECTION—*continued*

B. H. R. Christie, B.Sc., Conservation Officer, Kalomo.
 J. B. C. Kilfoil, B.Sc., Conservation Officer, Broken Hill.
 P. M. B. Brogan, B.Sc., Conservation Officer, Salisbury (seconded).
 W. C. Verboom, DIP. AGRIC., Conservation Officer, Choma.
 J. P. Hughes, Executive Assistant, Headquarters, Lusaka.
 G. M. King, Clerk, Headquarters, Lusaka.
 Mrs. H. E. Galer, Temporary Clerk, Headquarters, Lusaka.
 Mrs. M. A. McLellan, Temporary Part-time Clerk, Headquarters, Lusaka.
 P. G. Jones, Conservation Supervisor, Headquarters, Lusaka.
 S. W. Adamson, Conservation Supervisor, Broken Hill.
 M. W. de la Harpe, Conservation Supervisor, Mazabuka.
 A. F. Wilby, Conservation Supervisor, Lusaka.
 N. D. Thomas, Conservation Supervisor (on leave).
 W. H. Meyer, Conservation Supervisor, Lusaka.
 P. E. Anderson, Conservation Supervisor, Lusaka.
 R. G. Brune, Conservation Supervisor, Broken Hill.
 P. D. Mayne, Conservation Supervisor, Choma.
 H. W. Thwaites, Mechanical Superintendent, Lusaka.
 E. J. Beckford, Mechanical Supervisor, Broken Hill.
 H. Cawood, Mechanical Supervisor, Broken Hill.
 J. S. Drake, Mechanical Supervisor, Broken Hill.
 C. A. Holberry, Mechanical Supervisor, Lusaka.
 W. R. Howard, Stores Officer, Lusaka.
 J. H. Jones, Workshop Mechanic, Lusaka.
 J. Martin, Workshop Mechanic, Lusaka.
 A. G. Morganti, Mechanical Supervisor, Lusaka.
 J. Mumberson, Mechanical Supervisor, Lusaka.
 R. E. Munro, Workshop Mechanic, Lusaka.
 P. Prendergast, Mechanical Supervisor, Lusaka.
 J. A. Urquhart, Workshop Mechanic, Lusaka.
 E. C. Ward-Watson, Workshop Mechanic, Lusaka.
 J. Wells, Mechanical Supervisor, Lusaka.
 F. J. Gunn, Workshop Mechanic, Lusaka.
 J. W. Reed, Pupil Trainee, Workshops, Lusaka.
 E. C. Shekell, Pupil Trainee, Workshops, Lusaka.
 M. A. Lendrum, Pupil Trainee, Workshops, Lusaka.
 Miss P. J. M. Drake, Learner Clerk (Tracer), Headquarters, Lusaka.

TOBACCO SECTION

J. C. Collins, B.Sc., Chief Tobacco Adviser, Headquarters, Lusaka.
 A. Carr, Assistant Tobacco Adviser (on leave pending resignation).
 T. F. O'Callaghan, B.Sc., Assistant Tobacco Adviser, Choma.
 W. J. D. Watson, Assistant Tobacco Adviser, Broken Hill.
 F. J. Barrett, Assistant Tobacco Adviser, Choma.
 M. J. Lewis, DIP. AGRIC., Tobacco Supervisor, Choma.
 Sir W. R. Codrington, BART., Tobacco Supervisor, Msekera.
 I. C. M. Patterson, Pupil Trainee, Msekera.
 Mrs. J. Bolderson, Stenographer, Headquarters, Lusaka.

SOUTHERN PROVINCE

J. D. Yelf, M.A., A.I.C.T.A., Agricultural Officer, Choma.
 J. E. Mansfield, B.Sc. (WYE), DIP. AGRIC. (READING), Agricultural Officer (on leave).
 F. Durocher-Yvon, M.B.E., DIP. AGRIC., Agricultural Officer, Monze.
 W. F. van de B. Morkel, B.Sc., D.T.A., Agricultural Officer, Kalomo.
 A. B. C. Collocott, Temporary Clerk, Choma.
 Mrs. T. McMullen, Stenographer, Choma.
 A. R. Machlachlan, Agricultural Supervisor, Monze.
 K. D. Reed, Agricultural Supervisor, Monze.
 B. J. O'Neil Shepherd, Agricultural Supervisor, Monze Agricultural Training School, Monze.
 J. S. D. M. Johnstone, M.B.E., Agricultural Supervisor, Mapangazia.
 G. J. J. van Rensburg, DIP. AGRIC., Agricultural Supervisor (on leave).
 E. R. Woollard, DIP. HORT. (WYE), Agricultural Supervisor, Magoye.
 P. W. Lake, Agricultural Supervisor, Gwembe.
 A. M. Donaldson, Agricultural Supervisor, Mapanza.
 E. G. Dabinett, Agricultural Supervisor, Kanchomba.
 African Agricultural Assistants: 71
 African Agricultural Capitaos: 19.

GWEMBE VALLEY RESETTLEMENT SCHEME

G. A. Perfect, Agricultural Supervisor.
 D. K. R. Bray, Agricultural Supervisor.

CENTRAL PROVINCE

H. H. Roberts, B.SC. (AGRIC.), Agricultural Officer, Broken Hill.
J. S. Blacklock, DIP. AGRIC., C.D.D., A.I.C.T.A., Agricultural Officer, Chalimbana Government Farm, Lusaka.
B. L. Batwell, B.SC. (AGRIC.), Agricultural Officer, Mkushi.
G. N. Ball, Agricultural Supervisor, Broken Hill.
Mrs. H. H. Brooks, Temporary Clerk, Broken Hill.
D. T. Harwood, C.D.A., Agricultural Supervisor (on leave).
D. P. Hinton, B.SC., Agricultural Officer (on leave pending termination of appointment).
R. Simms, Agricultural Supervisor, Serenje.
R. H. Howard, M.B.E., Principal Agricultural Supervisor, Sala.
A. F. Nicoll, Agricultural Supervisor, Sala/Mukulaikwa.
H. L. M. Hewitt, Agricultural Supervisor, Mukulaikwa.
C. S. Mitchell, Principal Agricultural Supervisor, Mumbwa.
J. H. Farwell, Agricultural Supervisor, Chalimbana Government Farm, Lusaka.
J. H. S. Perioli, Agricultural Supervisor (on leave).
African Agricultural Assistants: 43.
African Agricultural Capitaos: 55.

EASTERN PROVINCE

R. B. Reid, B.SC., N.D.A., Chief Agricultural Officer, Fort Jameson.
R. N. Coster, B.SC., D.T.A., Agricultural Officer (on leave).
P. Greening, B.SC., D.T.A., Agricultural Officer, Petauke.
K. D. Ransom, Clerk, Fort Jameson.
Mrs. H. S. Williams, Temporary Clerk, Fort Jameson.
J. M. Helliwell, Agricultural Supervisor (on leave pending termination of appointment).
W. R. Lindsay-Stewart, Agricultural Supervisor, Kalichero.
J. Thomson, Agricultural Supervisor, Chadiza.
P. J. Fisher, Agricultural Supervisor, Katete.
G. B. Emslie, Agricultural Supervisor, Lundazi.
W. A. Denchfield, Principal Agricultural Supervisor, Fort Jameson.
A. H. Farncombe, Agricultural Supervisor, Petauke.
P. W. P. Madge, Agricultural Supervisor, Petauke.
T. D. Quiery, Agricultural Supervisor (travelling on appointment).
African Agricultural Assistants: 52.
African Agricultural Capitaos: 118.

WESTERN AND NORTH-WESTERN PROVINCES

C. J. McK. Krige, B.SC. (AGRIC.), Chief Agricultural Officer, Ndola.
P. Devonald, B.SC. (AGRIC.), D.T.A., Agricultural Officer, Balovale.
E. F. Dowdall, Clerk, Ndola.
Mrs. E. J. Wilson, Temporary Clerk, Ndola.
Mrs. F. E. Gourdie, Temporary Clerk, Ndola.
R. M. Wood, Agricultural Supervisor, Ndola.
G. W. E. Pickworth, N.D.A., C.D.A., Agricultural Supervisor, Kambowa.
P. A. Henderson, Agricultural Supervisor (on leave).
E. L. de S. Mason, DIP. AGRIC., Agricultural Supervisor, Kasempa.
A. W. Gow, Agricultural Supervisor, Kabompo.
W. J. Rutledge, B.SC., Agricultural Supervisor, Kambowa.
African Agricultural Assistants: 28.
African Agricultural Capitaos: 52.

NORTHERN PROVINCE

J. H. Rhodes, B.SC., DIP. AGRIC. (CANTAB.), D.T.A., Agricultural Officer, Kasama.
F. J. Smart, B.A., DIP. AGRIC. (CANTAB.), A.I.C.T.A., Agricultural Officer, Lunzuwa, Agricultural Training Centre, Lunzuwa.
I. L. Edwards, Agricultural Supervisor, Kasama.
Mrs. D. H. Bowers, Temporary Clerk, Kasama.
A. C. Downer, N.D.A., C.D.A., Agricultural Supervisor (on leave).
W. V. Morony, Agricultural Supervisor, Isoka.
P. M. McIntyre, Agricultural Supervisor, Fort Rosebery.
D. F. Wallace, Agricultural Supervisor, Luwingu.
J. M. Frew, Principal Agricultural Supervisor, Kawambwa.
J. H. Alder, Agricultural Supervisor, Lunzuwa.
African Agricultural Assistants: 68.
African Agricultural Capitaos: 68.

BAROTSE PROVINCE

J. A. Allan, B.SC. (AGRIC.), Agricultural Officer, Mongu.
A. D. McLeod, Agricultural Supervisor, Mongu.
W. M. Singer, Agricultural Supervisor, Mongu.
Mrs. M. W. Singer, Temporary Part-time Clerk, Mongu.
A. S. Heaton-Smith, N.D.A., C.D.A., Agricultural Supervisor, Mankoya.
African Agricultural Assistants: 25.
African Agricultural Capitaos: 33.

